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Advances in lipid film based biosensors

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ABSTRACT

Since first report on formation stable free standing bilayer lipid membranes (BLM) in 1962 by Mueller et al. [1] these systems became very popular in modeling various membrane processes at molecular level, such as ionic transport, ligand-receptor interactions or lipid-protein interactions. Despite of advantage of BLM in respect of variation in lipid composition and their modifications by receptors and proteins, the work with these systems was rather difficult due to their limited stability. The situation has been considerably improved by introduction of supported bilayer lipid membranes (sBLM) in 1980 by Thompson et al. [2] for possible applications in biosensors. Recent advances in stabilization of supported lipid membranes, appearance of novel nanomaterials such as carbon nanotubes has increased the number of publications on this topic. This review summarizes latest achievements in the field of biosensors utilizing sBLMs.

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1. Introduction

The biomembrane is the basic cell structure that serves not only as the barrier that separate intracellular and extracellular environ-

ment, but contain macromolecules that provide various function important for living organisms, such as transport of ions and other compounds, receptor functions, immunity response and others. The lipid environment protects the biopolymers against degradation. This extremely thin (approx. 5 nm) lipid matrix with incorporated receptors is unique biosensor developed by nature. Since discovery of model bilayer lipid membranes (BLM) by Mueller et al. [1], there have been attempts to use them in biosensing applications. However,

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